Kansas Agricultural Experiment Station Research Reports

Volume 0
Issue 10 *Swine Day (1968-2014)*

Article 262

1979

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Abstract

Two hundred fifty eight, five-week old weanling pigs were used to evaluate various levels of dietary oats and oat hulls in swine diets by performance and incidence of diarrhea in pigs weaned at approximately 5 to 6 weeks of age (17.6 to 28.6 lbs.).; Swine Day, Manhattan, KS, November 8, 1979

Keywords

Swine day, 1979; Kansas Agricultural Experiment Station contribution; no. 80-136-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 371; Swine; Oats; Oat hulls; Pellets; Performance; Weanling pigs

Effects of Feeding Oats or Oat Hulls and Meal or Pellets on the Performance of Weanling Pigs

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Summary

Two hundred fifty eight, five-week old weanling pigs were used to evaluate various levels of dietary oats and oat hulls in swine diets by performance and incidence of diarrhea in pigs weaned at approximately 5 to 6 weeks of age (17.6 to 28.6 lbs.).

Pigs fed diets containing oats or oat hulls with crude fiber levels of 3.0, 3.9, 4.7, 5.6 or 7.3% had growth rates similar to those of pigs fed the basal corn-soybean meal diet. Pigs fed up to 40% ground oats in the diet had similar feed efficiency as pigs fed the basal diets. Pigs fed the 60% ground oats diet (7.3% CF) had significantly ($P<.05$) higher feed to gain ratios than those fed diets in meal form, but when the diet was pelleted, there was no difference. Feed-to-gain ratios for pigs fed the 2.8 or 5.5% oat hull diets tended to be slightly but not significantly higher than for pigs fed ground oat diets with similar crude fiber levels. Adding 5% fat to diets containing 40% oats gave growth rates similar to those of pigs fed the control ration; however, this diet improved feed efficiency slightly. Pelleting the diets containing oats or oat hulls had no effect on growth rates, but improved feed efficiency from 2.5% for the basal diet to 10.8% for the 60% oat diet over comparable diets fed in meal form. Diarrhea was not a problem in the trials, and daily diarrhea scores were similar for all treatments. Mortality was low in both trials, and no deaths could be attributed to dietary treatment.

Introduction

Problems facing many of today's swine producers are weaning stress and getting pigs started on feed without developing scours. Pigs usually perform poorly from 7 to 14 days after being weaned, depending on environmental conditions and management. Research has indicated diets higher in fiber reduce scours in early weaned pigs. These experiments evaluated dietary oats and oat hulls, fed in pelleted and meal form, by the performance of young pigs.

Experimental Procedures

General

Weaned pigs averaging 5 to 6 weeks of age were housed in an environmentally controlled, slatted-floor nursery, in 5' x 11' pens. Diets were offered ad libitum in self feeders, and water was supplied by nipple waterers. Subjective diarrhea scores were taken daily based on the following: 1 =

firm feces; 2 = soft feces; 3 = loose feces; 4 = watery feces; 5 = bloody feces. Scour scores were recorded on a pen basis. The scores are reported as average cumulative pen scores over a 14 day period. The basal corn-soybean meal diet contained 22.18% protein, 1.00% lysine, 0.79% calcium, and 0.69% phosphorus. Oats used tested 38 lb. per bushel. Oats or oat hulls were added by replacing corn on an equal-weight basis.

Trial 1

A growth trial was conducted to determine what effect pelleting would have on performance of pigs fed oats or oat hulls. Ninety-eight crossbred pigs (Duroc-Yorkshire-Hampshire) averaging 28.6 lbs. were allotted according to weight and sex to 14 pens representing two replicates of seven diets. All diets were pelleted. The 28-day experiment included the following diets:

A. Corn-soy fortified basal diet (CF 2.2%)
B. Basal + 20% oats (CF 3.9%)
C. Basal + 2.8% oat hulls (CF 3.9%)
D. Basal + 40% oats (CF 5.6%)
E. Basal + 5.5% oat hulls (CF 5.6%)
F. Basal + 60% oats (CF 7.3%)
G. Basal + 40% oats + 5% fat (CF 5.5%)

Trial 2

A 35-day trial was conducted with four diets comparing meal and pellet diet forms. Yorkshire pigs (160 head) averaging 24.2 lbs. were allotted according to weight and sex to 16 pens representing two replications of the eight dietary treatments. The experiment included these diets:

A. Basal, corn-soy fortified diet, meal (CF 2.2%)
B. Basal, corn-soy fortified diet, pelleted (CF 2.2%)
C. Basal + 20% oats, meal (CF 3.9%)
D. Basal + 20% oats, pelleted (CF 3.9%)
E. Basal + 40% oats, meal (CF 5.6%)
F. Basal + 40% oats, pelleted (CF5.6%)
G. Basal + 60% oats, meal (CF 7.3%)
H. Basal + 60% oats, pelleted (CF 7.3%)

Results and Discussion

Trial 1. Performance of pigs fed pelleted diets containing oats or oat hulls is shown in table 19. There were no significant differences in average daily gains (ADG). Pigs fed the 60% oat diet (7.3% crude fiber) consumed more feed ($P<.05$) than pigs fed the basal diet or diets containing 20 or 40% oats. Pigs fed the 20% oat diet ate significantly ($P<.05$) less feed/day than those fed the 40% oat diet. Pigs fed the diets containing 2.8 or 5.5% oat hulls (3.9% and 5.6% crude fiber, respectively) tended to eat more feed than those fed diets containing 20 or 40% oats (3.9% and 5.6% crude fiber, respectively) with similar crude fiber levels. Differences in feed/gain were not significant, but as the crude fiber level of the diets increased, feed/gain tended to increase, except on diets containing 20% oats and 40% oats with 5% fat. Diets containing oat hulls required the most feed

for gain though not significantly more. Adding 5% fat to a 40% oat diet had no significant effect on pig performance. As there was no diarrhea problem in this trial, daily diarrhea scores did not differ.

Trial 2. Performances of growing pigs fed meal or pelleted diets containing ground oats are shown in Table 20; neither growth rate nor daily feed consumption differed, nor did they differ when compared with those fed the basal diet. However, pigs fed the pelleted 40% oat diet gained significantly faster than pigs fed the 20% pelleted oat diets or the 40 or 60% oat meal diets. Pigs fed the pelleted 20% oat diet consumed significantly less feed/day than pigs fed the 60% oat meal diet. Pigs fed pelleted diets tended to eat slightly less feed/day than pigs fed comparable diets in meal form.

Feed/gain ratios tended to increase for pigs fed meal diets as oat content of diets was increased. Adding 60% oats (7.3% crude fiber) to the meal diet gave the poorest feed efficiency ($P<.05$) of all diets. Pelleted diets containing 20 or 40% oats tended to give better feed efficiency than the basal diets, and gave significantly ($P<.05$) better feed efficiency than the 60% pelleted oat diet. Pelleting the diets containing 20, 40 or 60% oats improved ($P<.05$) feed efficiency when compared with meal diets.

Scouring was not a problem in this trial. Diarrhea scores were similar for all pigs, whether fed pellets or meal form, basal, 20, 40, or 60% oats.

Table 19. Performance of Pigs Fed Pelleted Diets Containing Oats or Oat Hulls (Trial 1).

Criteria, %	Oats, %				Oat hulls, %		% Oats + 5% Fat
	0	20	40	60	2.8	5.5	40
Crude fiber, %	2.2	3.9	5.6	7.3	3.9	5.6	5.5
No. pigs[1]	14	14	14	14	14	14	14
Period I[2]							
ADG, lbs(kg)	1.34(.61)^{bc}	1.21(.55)^{c}	1.45(.66)^{ab}	1.50(.68)^{a}	1.39(.63)^{ab}	1.41(.64)^{ab}	1.36(.62)^{ab}
ADFI, lbs(kg)	1.87(.85)^{ab}	1.72(.78)^{a}	1.85(.84)^{ab}	1.98(.90)^{b}	1.91(.87)^{b}	1.96(.89)^{b}	1.89(.86)^{b}
F/G	1.39^{bc}	1.42^{c}	1.27^{a}	1.32^{ab}	1.38^{bc}	1.39^{bc}	1.39^{bc}
Period II[3]							
ADG, lbs(kg)	1.34(.61)	1.23(.56)	1.30(.59)	1.39(.63)	1.28(.58)	1.32(.60)	1.30(.59)
AFDI, lbs(kg)	2.16(.98)^{ab}	2.02(.92)^{a}	2.18(.99)^{b}	2.35(1.07)^{c}	2.18(.99)^{b}	2.24(1.02)^{bc}	2.09(.95)^{ab}
F/G	1.62	1.62	1.66	1.70	1.71	1.71	1.62
Dia. scores[4]	1.57	1.36	1.64	1.43	1.57	1.79	1.50

[1]Pig average initial weight 28.4 lbs.; final weight 65 lbs.; 2 replicates, 28 day trial.

[2]Days 0 to 7 post-weaning.

[3]Days 0 to 28 post-weaning.

[4]Average daily pen diarrhea scores based on subjective scores of 1=firm feces, 2=soft feces, 3=loose feces, 4=watery feces, and 5=bloody feces.

^{a,b,c}Means with different superscripts differ significantly ($P<.05$).

Table 20. Performance of Pigs Fed Meal or Pelleted Diets Containing Oats (Trial 2).

Criteria:	Basal	20% Oats	40% Oats	60% Oats
Crude fiber, %	2.2	3.9	5.6	7.3
No. pigs[1]				
meal	20	19	20	20
pellet	20	19	20	20
Period I[2]				
ADG, lbs. (kg)				
meal	.97(.44)	1.01(.46)	.95(.43)	.73(.33)
pellet	1.06(.48)	1.10(.50)	1.17(.53)	.99(.45)
ADFI, lbs.(kg)				
meal	1.21(.55)	1.23(.56)	1.10(.50)	.95(.43)
pellet	1.23(.56)	1.10(.50)	1.25(.57)	1.19(.54)
F/G				
meal	1.25	1.22	1.16	1.30
pellet	1.17	1.00	1.08	1.20
Period II[3]				
ADG, lbs.(kg)				
meal	$1.21(.55)^{ab}$	$1.25(.57)^{ab}$	$1.19(.54)^{b}$	$1.17(.53)^{b}$
pellet	$1.21(.55)^{ab}$	$1.19(.54)^{b}$	$1.32(.60)^{a}$	$1.21(.55)^{ab}$
ADFI, lbs.(kg)				
meal	$1.96(.87)^{ab}$	$2.09(.95)^{ab}$	$2.02(.92)^{ab}$	$2.13(.97)^{b}$
pellet	$1.91(.87)^{ab}$	$1.85(.84)^{a}$	$2.02(.92)^{ab}$	$2.02(.92)^{ab}$
F/G				
meal	1.62^{ab}	1.66^{a}	1.70^{a}	1.84^{c}
pellet	1.58^{ab}	1.54^{b}	1.54^{b}	1.66^{a}
Dia. scores[4]				
meal	1.57	1.64	1.71	1.43
pellet	1.64	1.43	1.50	1.57

[1]Average initial weight 24.2 lbs.; final weight 66.9 lbs.; 2 replicates; 35 day trial.

[2]Days 0 to 7 post-weaning.

[3]Days 0 to 35 post-weaning.

[4]Average pen diarrhea scores based on subjective scores of 1=firm feces, 2=soft feces, 3=loose feces, 4=watery feces, and 5=bloody feces.

[a,b,c]Means with different superscripts differ significantly ($P<.05$).